CLAIMS

1. A method for the manufacture of a cam shaft from a tube, which can be deformed by the action of axial forces and a medium under an internal pressure, characterized in that bearer rings, produced in a separate method and corresponding to the outline of the cams on said cam shaft, are placed in a high internal pressure forming tool together with the tube to be formed and subjected to the action of axial forces and a medium under a high internal pressure, whereby the bearer rings are attached by expansion of the tube in a frictional and interlocking manner.

2. The method as set forth in claim 1, characterized in that in a first method step prior to such high internal pressure forming, regions that lie outside the regions in which the cams are seated, are so kneaded and/or upset that same are increased in thickness and/or are stretched and thus different functional elements are formed.

3. The method as set forth in claim 1, characterized in that between the cam shaft ends in the first method step prior to internal high pressure forming bearing faces and the eventual region where the cams are to be seated, are produced round kneading by reducing the diameter in this part to the desired size.

4. The method as set forth in claim 1 or in claim 2, characterized in that between cams bearing faces are produced by internal high pressure forming by expanding the tube.

5. The method as set forth in claim 1, characterized in that the bearer rings are hardened in a known manner prior to being placed in the internal high pressure forming tool.

6. The method as set forth in claim 1, characterized in that a gear wheel or sprocket wheel produced in a separate method is placed in the internal high pressure forming tool and is connected by the internal high pressure forming step frictionally and/or in an interlocking manner.

7. The method as set forth in claim 1, characterized in that after the production of the thickened and/or tapered ends of the cam shaft internal gear teeth and/or a thread is produced by round kneading in an additional method step integrated in an additional method step as part of this method step.

8. A cam shaft produced as set forth in claim 1, characterized in that the cam shaft is so produced from a tube (1) by an internal high pressure forming method that the shaft complies peripherally to have all cams (2) in form and in position in a single piece, that on the formed cams (2) a bearer ring (3), shaped to correspond to the cam periphery and made of a hard, wear-resistant material is secured frictionally and in an interlocking manner, on which in a known manner bearing elements and/or drive elements and/or control elements (5) are arranged.

9. A cam shaft produced as set forth in claim 8, characterized in that the bearer rings (3) possess the same wall thickness.

10. A cam shaft produced as set forth in claim 8, characterized in that the thickness of the bearer rings (3) is variable, the thickness being greatest near the cam tip.

11. A cam shaft produced as set forth in claim 8, characterized in that the bearer ring (3) is produced of sintered metal, or plastic or ceramic material.

12. A cam shaft produced as set forth in claim 8, characterized in that the tube (3) is produced of aluminum, magnesium or titanium or its alloys.

13. A cam shaft produced as set forth in claim 8, characterized in that the ends of the tube (3) are formed by kneading so that by expansion or tapering the original diameter (D_i and d_a) of the tube (1) possesses bearing faces, drive and/or control elements and internal and/or external screw threads.

14. A cam shaft produced as set forth in claim 8, characterized in that the drive and control elements, preferably sprocket or gear wheels, are produced by an internal high pressure forming method.

15. A cam shaft produced as set forth in claim 14, characterized in that at least one radially extending groove (4) is produced in the bearer ring (3) and the drive and control elements.

16. A cam shaft produced as set forth in claim 14, characterized in that the side, facing the tube (1) of the bearer ring (3) has chamfers on one or both sides on the side facing the tube

17. A cam shaft produced as set forth in claim 8, characterized in that the bearer ring (3) is hardened prior to application on the formed cams.